

# QUICK INSTALLATION



## HiGAIN H2TU-C-319 LIST 7A2 LINE UNIT



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## THE H2TU-C-319 LIST 7A2

The H2TU-C-319 List 7A2 (H2TU-C) line unit is the Central Office (CO) side of a T1 transmission system. The H2TU-C, when used with an H2TU-R remote unit, transmits a 1.544 Mbps payload on one unconditioned copper pair over the full Carrier Service Area (CSA) range. The H2TU-C-319 List 7A2 is designed to mount in 3192mechanics shelves and to provide behavior consistent with the managed line units that are part of the LoopStar product family.

The H2TU-C-231-L7A2, H2TU-C-319-L7A2, or H2TU-C-388-L7A2 require the H2TU-R-402L7A1 to be used as the remote unit for Remote Ground Detect.

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## FEATURES

**Front-panel features:** craft port for maintenance screen access, display panel for system status reporting, status LED, and DSX-1 access jacks

**HDSL2 transmission features:**

- Full-duplex transmission on one copper pair
- Grounded loop detection on HDSL2 span
- Sources sealing current

**Maintenance screens** for inventory, provisioning, performance monitoring, and troubleshooting, including:

- Remote provisioning
- Loopshield queries via TL1/FDL capability

- Remote Frame Ground Detect (via craft screens, 4-character display, or TL1/FDL query)
- Fault sectionalization (via TL1/FDL query)
- Loop attenuation and insertion loss reporting
- Loss of Signal / Alarm Indication Signal (LOS/AIS) payload alarm option
- Power Back Off (PBON and PBOC) for configuring HDSL2 transmit power levels to reduce crosstalk
- Report menu option for downloading status and performance data
- DS1 and HDSL2 alarm histories

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## SPECIFICATIONS

<b>Operating Temperature</b>	-40°F to +149°F (-40°C to +65°C)
<b>Operating Humidity</b>	5% to 95% non-condensing
<b>HDSL2 Span Voltage</b>	0 or -180 Vdc $\pm$ 5 Vdc
<b>CO Supply</b>	-48 Vdc nominal (-42.5 Vdc to -56.5 Vdc)
<b>Mounting</b>	3192 mechanics shelves
<b>HDSL2 Line Rate</b>	1.552 Mbps Overlapped Pulse Amplitude Modulation Transmission with Interlocking Spectra (OPTIS)
<b>HDSL2 Output</b>	+16.8 dBm $\pm$ 0.5 dBm, 135 $\Omega$ at CO side +16.5 dBm $\pm$ 0.5 dBm, 135 $\Omega$ at remote side
<b>Maximum Insertion Loss</b>	35 dB @ 196 kHz
<b>Maximum Loop Attenuation</b>	28 dB
<b>DSX-1 Line Rate</b>	1.544 Mbps $\pm$ 200 bps
<b>DSX-1 Line Format</b>	Alternate Mark Inversion (AMI) or Bipolar with 8-Zero Substitution (B8ZS)
<b>DSX-1 Frame Format</b>	Extended SuperFrame (ESF), SuperFrame (SF), or Unframed (UNFR)
<b>DSX-1 Pulse Output</b>	6 V <sup>pk-pk</sup> , pre-equalized for 0 to 655 feet of ABAM cable
<b>DSX-1 Input Level</b>	+1.5 dB to -7.5 dB DSX
<b>Compatibility</b>	Works with H2TU-402-L7A1 Remotes

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# 1 INSTALLATION

Align the H2TU-C with the shelf card-slot guides and slide the unit in. Push on the H2TU-C front panel to snap the unit into place.

## 2 POWER-UP SEQUENCE

When the H2TU-C powers up, the four-character display illuminates and displays status messages.

If the H2TU-C is unable to communicate with the H2TU-R, it displays various alarm and status messages. If the H2TU-C is able to communicate with the H2TU-R, the following occurs:

- The Status LED flashes red while acquiring the H2TU-R and then turns a steady green when the entire system is operating with no alarms. (The DS1 signal must be present.)
- The front-panel display reports signal-to-noise ratio (SNR) margin readings (should be  $\geq 6$  dB) and loop attenuation (should be  $< 28$  dB).

After the system powers up, existing alarm conditions are reported on the display. (The H2TU-C reports alarms if no DS1 signal is applied.)

## 3 PROVISIONING

Perform these basic provisioning tasks:

- 1 Connect a maintenance terminal to the craft port (see front-panel illustration inside) and log on. Press **CTRL** + **R** to refresh the logon screen, if necessary.  
Refer to the onscreen Help menu for navigational aids or use the **SPACEBAR** (to cycle through selections), **ENTER** (to activate the current setting or selection, or to display a menu), **ESC** or **F11** (to return to the parent menu), or directional arrow keys (to navigate to a menu or item).
- 2 Select **Config, Date and Time**, then type the date and time.
- 3 Select **Inventory**, then type the circuit ID, H2TU-R ID, and circuit notes.
- 4 Change the settings of any system parameters, if necessary, by selecting **Config**, then **Standard Options** or **ADC Options**. (Configuration options can also be set from the front panel using the MODE and SEL pushbuttons. See [Table 3](#) inside.)

Once the H2TU-C is successfully installed and provisioned, access the Monitor, Performance, or Event Log menus to clear the Performance, Alarm History, or Event Log screens, or use Master Clear in the Config menu.

*Continued*





**Table 1. Front-Panel Alarm Messages <sup>(a)</sup>**

Message	Description
PWR FEED SHRT <sup>(b)</sup>	A short between the Tip and Ring of the HDSL2 pair.
PWR FEED GND <sup>(b)</sup>	The HDSL2 loop is grounded.
PWR FEED OPEN <sup>(b)</sup>	A line-power open condition.
LOSW	The HDSL2 loop has lost synchronization.
LLOS	No signal is detected at the DSX-1 input to the H2TU-C.
RLOS	No signal is detected at the DS1 input to the H2TU-R.
LAIS <sup>(c)</sup>	Line Alarm Indication Signal.
RAIS <sup>(c)</sup>	Remote Alarm Indication Signal.
LRAI <sup>(c)</sup>	An RAI alarm (yellow) from the CPE without errors from the line unit or network.
RRAI <sup>(c)</sup>	An RAI alarm (yellow) from the CPE with errors from the line unit or network.
xxx-LOF	The DS1 input does not contain the ESF or SF frame pattern setting of the FRMG option. (xxx denotes either TUC or TUR.)
xxx-DBER <sup>(c)</sup>	A system DS1 Bit Error Rate (BER) alarm. (xxx denotes either Transmission Unit Central Office [TUC] or Transmission Unit Remote End [TUR].)
PRMF <sup>(c)</sup>	H2TU-R Performance Report Messaging BER threshold exceeded at far end.
PRMN <sup>(c)</sup>	H2TU-R Performance Report Messaging BER threshold exceeded at near end.
xxx-HBER	A system HDSL2 Block Error Rate (BER) alarm. (xxx denotes either TUC or TUR.)
xxx-MAL	The margin on the HDSL2 loop has dropped below the threshold setting. (xxx denotes either TUC or TUR.)
xxx-LA	The attenuation on the HDSL2 loop has exceeded the maximum threshold value. (xxx denotes either TUC or TUR.)

(a) Front-panel alarm messages are listed in order of priority. ALRM displays prior to any alarm message. Pressing the LBK pushbutton initiates an Alarm Cutoff (ACO) message.

(b) Message displays repeatedly as long as the alarm condition exists, and is not included in the priority order.

(c) Does not activate the alarm relay access on pin H.

**Table 2. Front-Panel System Information Messages (Scroll Mode) <sup>(a)</sup>**

Code	Description	Code	Description
VER x.xx	Firmware version.	CODE xxxx	Line code (AMI, B8ZS).
LIST xx	Product list number.	LATT xx	Loop attenuation (0 to 40 dB). Default is 35.
FRM xxxx	Frame pattern received from the DSX-1 (SF, ESF, or UNFR).	MARG xx	Margin threshold (0 to 15 dB). Default is 5.

(a) To scroll through system information messages, press the MODE pushbutton for 3 or more seconds.

**Table 3. Front-Panel Configuration Options Using MODE and SEL <sup>(a)</sup>**

Display Code	Description (default values in bold)
EQL	Sets the DSX-1 Equalizer to: <b>0</b> (0 to 132 ft.), 133 (133 to 265 ft.), 266 (266 to 398 ft.), 399 (399 to 532 ft.), or 533 (533 to 655 ft.).
RLBO	Sets the H2TU-R line buildout to <b>0 dB</b> , -7.5 dB, or -15 dB.
LPBK	Enables ( <b>ENA</b> ) or disables ( <b>DIS</b> ) SmartJack loopback commands.
SPLB xxxx	Configures system for generic (GNLB) or special in-band loopback commands (A1LB, A2LB, A3LB, A4LB, or <b>A5LB</b> ).
PWRF	<b>OFF</b> = disables HDSL2 powering; <b>ON</b> = HDSL2 line voltage is -180 Vdc maximum.
HBER	<b>1E-6</b> or <b>1E-7</b> = alarm activates when the HDSL2 BER alarm threshold exceeds $10^{-6}$ or $10^{-7}$ . <b>NONE</b> = prevents generation of a system alarm due to BER.
DBER	Enables ( <b>ENA</b> ) or disables ( <b>DIS</b> ) fixed 24-hour DS1 BER alarm threshold.
LBTO	Loopback timeout = <b>NONE</b> , 20, 60, or <b>120</b> minutes or 8 or 24 hours.
ALM	Enables ( <b>ENA</b> ) or disables ( <b>DIS</b> ) alarm indications on pin H.
DS1	DSX-1 line code = <b>AUTO</b> , B8ZS, or AMI.
FRMG	DS1 frame formatting = <b>AUTO</b> (Auto framing mode), SF (SuperFrame), ESF (Extended SuperFrame), or UNFR (Unframed mode).
RDA	Enables ( <b>ENA</b> ) or disables ( <b>DIS</b> ) alarm indications due to remote DS1 LOS at H2TU-R input.
ALMP	Enables system to output an alarm pattern: <b>AIS</b> or LOS.
BPVT	Enables ( <b>ENA</b> ) or disables ( <b>DIS</b> ) Bipolar Violation Transparency.
NLBP	Enables the H2TU-R to transmit either <b>AIS</b> or LOS towards CI for any network loopback.
TLOS	Enables ( <b>ENA</b> ) or disables ( <b>DIS</b> ) a logic loopback at the H2TU-R when an LOS occurs at its DS1 input.
RTPV	Enables ( <b>ENA</b> ) or disables ( <b>DIS</b> ) remote provisioning.
PBON	Configures the power output levels of the H2TU-C network unit toward the customer to comply with Default ( <b>DEF</b> ) or Enhanced ( <b>ENH</b> ) templates.
PBOC	Configures the power output levels of the H2TU-C customer unit toward the network to comply with Default ( <b>DEF</b> ) or Enhanced ( <b>ENH</b> ) templates.

(a) Front-panel configuration options display in the order listed.

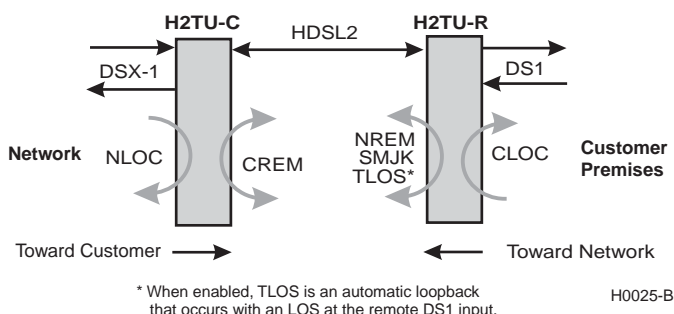
**Table 4. Front-Panel Diagnostic Messages**

Message <sup>(a)</sup>	Description
<b>A=xx</b>	The highest loop attenuation (loss of signal power) measured in dB.
ACQ	The H2TU-C and H2TU-R are trying to establish synchronization.
ARM	The H2TU-C is armed to respond to Intelligent Repeater Loop (ILR) codes.
BAD RT?	The H2TU-C is not receiving a response from the H2TU-R.
BAD RGND	The H2TU-R does not have a frame ground connection.
FERR	A framing bit error has occurred at H2TU-C DSX-1 input.
HES	H2TU-C HDSL2 loop cyclical redundancy check (CRC) error.
LBPV	A local bipolar violation has been received at the DSX-1 input to the H2TU-C.
<b>M=xx</b>	The power of the received HDSL2 signal relative to noise (S/N with respect to 21.5 dB).
PWR FEED OFF	HDSL2 span power is turned off.
PWR FEED ON	HDSL2 loop is not grounded or shorted.
SIG	The transceivers of the H2TU-C and H2TU-R are trying to establish contact with each other over the HDSL2 loop.

(a) Normal operating messages are in bold.

## 4 LOOPBACK TESTING

Initiate loopback testing from the maintenance menus, the front-panel MODE and SEL pushbuttons, or a test set. Inband codes used by a test set are shown in Table 5.



**Table 5. Loopback Commands**

Loopback	Inband Code	Description
NLOC	1111000	DSX-1 signal is looped back to the network at the H2TU-C.
NREM	1110000	DSX-1 signal is looped back to the network at the H2TU-R.
COLB <sup>(a)</sup>		DSX-1 signal is looped back to the network at the H2TU-C and signal from the customer is looped back to the customer at the H2TU-C.
RULB <sup>(a)</sup>		DSX-1 signal is looped back to the network at the H2TU-R and signal from the customer is looped back to the customer at the H2TU-R.
CREM	1111110	DS1 signal from customer is looped back to the customer at the H2TU-C.
CLOC	1111100	DS1 signal from customer is looped back to the customer at the H2TU-R.
SMJK	11000	DSX-1 signal is looped back to the network at the H2TU-R SmartJack module.
Loopdown	11100	Deactivates any of the above loopbacks.

(a) Dual loopbacks can be initiated only from the front-panel MODE and SEL pushbuttons.



**Copies of this publication or the user manual (LTPH-UM-1261) can be downloaded from the ADC website at [www.adc.com](http://www.adc.com). To order a hard copy, please contact your sales representative.**



**To comply with the intrabuilding wiring requirements of GR-1089 CORE, Section 4.5.9, the shields of the ABAM-type cables that connect the line unit DSX-1 output ports to the cross-connect panel must be grounded at both ends.**

## FCC Class A Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Limited Warranty

Product warranty is determined by your service agreement. Contact your sales representative or Customer Service for details.

## Modifications

Any changes or modifications made to this device that are not expressly approved by ADC Telecommunications, Inc. voids the user's warranty.

All wiring external to the products should follow the provisions of the current edition of the National Electrical Code.

## Standards Compliance

This equipment has been tested and verified to comply with the applicable sections of the following safety standards:

- GR 63-CORE - Network Equipment-Building System (NEBS) Requirements
- GR 1089-CORE - Electromagnetic Compatibility and Electrical Safety
- Binational standard, UL-60950/CSA C22.2 No. 60950-00: Safety of Information Technology Equipment.

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